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(54) Printing Machine Cylinder

(57) A cylinder suitable for use in printing machines, comprises an outer shell (3) and possibly an intermediate layer (4). The shell (3) has a rough outer surface, is grease-repellent and wear-resistant and has a maximum

thickness of 0.15 millimetres. The shell (3) comprises at least 30% by weight of nickel and/or chrome and at least one further metal, metallic oxide and/or carbide of the elements molybdenum, tungsten, cobalt, aluminium, boron, manganese, titanium, magnesium and cerium.

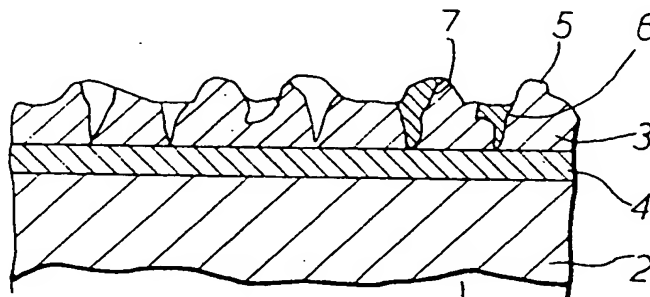
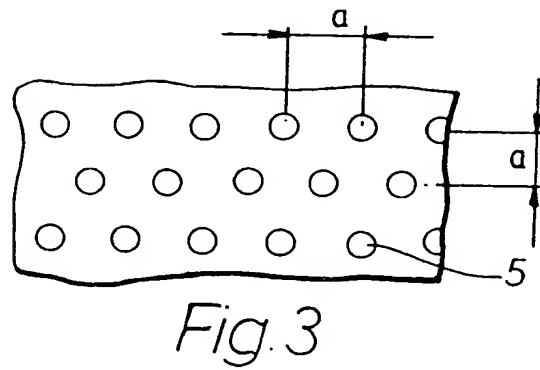
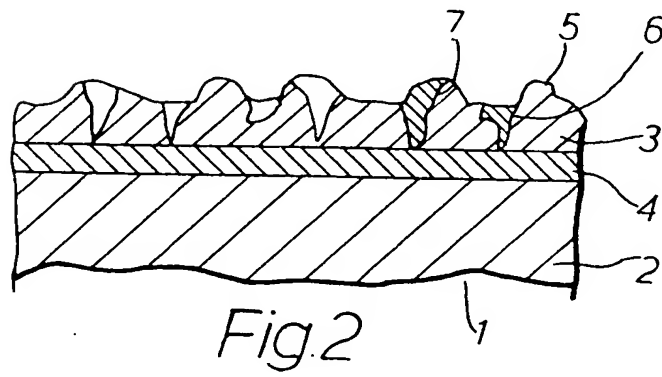
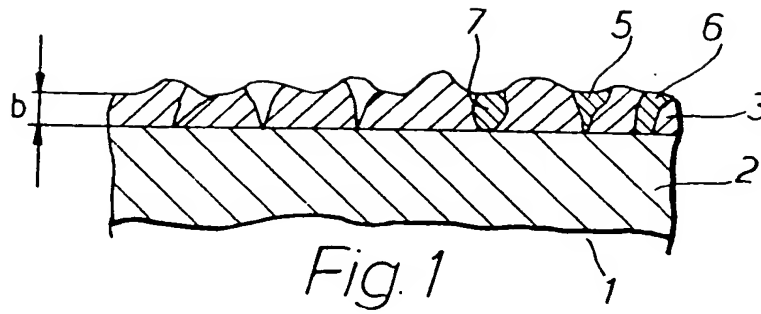


Fig.2

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## SPECIFICATION

## Cylinder for a Printing Machine

The present invention relates to a cylinder for a printing machine. DE-OS 2 602 277 discloses a cylinder comprising a cylinder body provided with a shell. The shell, the surface of which has a roughness of 7 to 25 micrometres, comprises of oxides of titanium, aluminium, magnesium and other metals.

Such shells are used to protect the cylinder surface against damage by substances used for printing and cleaning, to render the shell surface resistant to wear and as far as possible to avoid the deposition of printing ink on the both-sided printing of the printed sheets and to enhance the detaching of the sheets, ironed on under pressure, from the cylinder.

According to the present invention there is provided a cylinder suitable for a printing

machine, comprising a cylinder body surrounded by a grease repellent and wear resistant shell having a thickness of at most 0.15 millimetres and a rough outer surface, the shell comprising at 30% by weight of at least one of nickel and chrome and also comprising at least one of further metals, metallic oxides, and carbides of at least one of molybdenum, tungsten, cobalt, aluminium, boron, manganese, titanium, magnesium and cerium.

The cylinder may comprise an intermediate layer which is disposed between the shell and the cylinder body and which comprises 60% nickel and 40% aluminium by weight.

The cylinder may comprise an intermediate layer which is disposed between the shell and the cylinder body and which comprises 70% nickel and 30% aluminium by weight.

The shell may comprise pores in the outer surface thereof, the pores containing an acid resistant and a grease repellent substance which watertightly and airtightly close off the pores.

The substance may comprise Teflon (Registered Trade Mark) and/or copying enamel.

The outer surface of the shell may have a mean of 25 points per square millimetre of the surface unevenly distributed over the surface.

The roughness of the outer surface of the shell may be 20 to 100 micrometres.

The points may be rounded.

At least some of the points may have a mean spacing from one another of 100 to 200 micrometres.

The shell may have a maximum thickness of 150 micrometres.

It is not absolutely necessary to fill out and to close off, by a sealing substance, the pores which may be provided in the outer surface, since the material composition used may offer good corrosion protection and high degree of homogeneity, which may be improved by sealing-off of pores.

Embodiments of the present invention will now be more particularly described by way of example and with reference to the accompanying drawing

in which:

Fig. 1 shows a section through a part of a cylinder comprising a shell surrounding a cylinder body,

Fig. 2 shows a section through a part of a cylinder comprising an intermediate layer between the shell and the cylinder body, and

Fig. 3 shows a schematic plan view on the outer surface of the shell.

Fig. 1 shows a section through a part of a cylinder 1, the cylinder body 2 of which comprises cast iron or steel. The cylinder body 2 is provided with a shell 3 comprising nickel and/or chrome of at least 30% by weight and admixtures of further metals and/or metallic oxides and/or carbides of molybdenum, tungsten, cobalt, aluminium, boron, manganese, titanium, magnesium and cerium.

The maximum thickness  $b$  of the shell 3 amounts to 150 micrometres.

Fig. 2 shows an intermediate layer 4 comprising nickel/aluminium in a quantity of 70/30 or 60/40. The intermediate layer 4 forms an adhesive layer for the shell 3, which possesses the same composition as in the embodiment shown in Fig. 1.

The shell 3 has an outer surface, the roughness of which is between 20 to 100 micrometres and is determined by the height, spacing and shape of a plurality of support points 5 which are distributed irregularly over the surface and which do not touch one another. The support points 5 have rounded edges, whilst a mean number of 25 support points 5 is distributed per square millimetre at a spacing  $a$  of 100 to 200 micrometres (Fig. 3). This surface structure and the preservation of the expression of even finest rasters, provides an air space between cylinder shell and printed sheet, which ensures easy detachment of a printed sheet after printing and a flutter-free running-in of the printed sheet into the printing zone. To increase the corrosion resistance of the shell, pores 6 in the shell 3 can be sealed off by a sealing substance 7, for example Teflon, copying enamel or any other appropriate substances.

The shell 3 is closed completely by the sealing substance 7 and is thus resistant against all washing media, diluted acids and other aggressive liquids. The invention is not restricted to cylinders 1 to be used in printing machines, but it is possible to equip complete or segmental surfaces of sheet-guiding drums with a shell described above.

An advantage of the above described embodiment is that a cylinder is provided in which the shell is optimally wear-resistant, corrosion-proof, grease-repellent and resistant to all substances applied for printing and cleaning, and the shell does not deleteriously influence the printing process and the printing quality.

## 125 Claims

1. A cylinder suitable for a printing machine, comprising a cylinder body surrounded by a grease repellent and wear resistant shell having a

thickness of at most 0.15 millimetres and a rough outer surface, the shell comprising at 30% by weight of at least one of nickel and chrome and also comprising at least one of further metals

5 metallic oxides, and carbides of at least one of molybdenum, tungsten, cobalt, aluminium, boron, manganese, titanium, magnesium and cerium.

2. A cylinder as claimed in claim 1, comprising an intermediate layer which is disposed between the shell and the cylinder body and which

10 comprises 60% nickel and 40% aluminium by weight.

3. A cylinder as claimed in claim 1, comprising an intermediate layer which is disposed between the shell and the cylinder body and which

15 comprises 70% nickel and 30% aluminium by weight.

4. A cylinder as claimed any one of the preceding claims, wherein the shell comprises

20 pores in the outer surface thereof, the pores containing an acid resistant and a grease repellent substance which watertightly and airtightly close off the pores.

5. A cylinder as claimed in claim 4, wherein the

25 substance comprises Teflon.

6. A cylinder as claimed in claim 4, wherein the substance comprises copying enamel.

7. A cylinder as claimed in any one of the preceding claims, wherein the outer surface of the

30 shell has a mean of 25 points per square millimetre of the surface unevenly distributed over the surface.

8. A cylinder as claimed in any one of the preceding claims, wherein the roughness of the

35 outer surface of the shell is 20 to 100 micrometres.

9. A cylinder as claimed in either claim 7 or claim 8, wherein the points are rounded.

10. A cylinder as claimed in any one of claims

40 7 to 9, wherein at least some of the points have a mean spacing from one another of 100 to 200 micrometres.

11. A cylinder as claimed in any one of the preceding claims, wherein the shell has a

45 maximum thickness of 150 micrometres.

12. A cylinder suitable for use in a printing machine, substantially as hereinbefore described with reference to Figure 1 and Figure 3 of the

50 accompanying drawing.

13. A cylinder suitable for use in a printing machine, substantially as hereinbefore described with reference to Figure 2 and Figure 3 of the accompanying drawing.